United States
Environmental Protection
Agency

Administration and
Resource Management
(3204)

EPA202-N-99-003
August 1999
www.epa.gov/consrv-news

EPA

Greening EPA

A Look at Agencywide Environmental Progress

Issue Three

Wow!

We are pleased to provide another issue of *Greening EPA*. Our cover story is an article on important changes expected with the new energy-efficiency Executive Order. Please be sure to read it. We also have interesting articles on EPA's new green buildings at Ann Arbor and Ft. Meade, EPA's alternative fuel vehicle fleet and chemical management programs, and an article on biomass—a renewable energy source EPA is investigating for use in its facilities. I hope you enjoy this issue. Please call me if you have questions or comments on any of these articles.

—Phil Wirdzek, FMSD

The mission of the U.S. Environmental Protection Agency is to protect human health and to safeguard the natural environment—air, water, and land—upon which life depends.

Updated Energy Management Executive Order Signed

With more than 500,000 buildings, the federal government is the nation's largest energy consumer and perfectly positioned to be an energy management leader. To help make that happen, President Clinton signed Executive Order (EO) 13123, *Greening the Government Through Efficient Energy Management,* on June 3, 1999. The EO sets greenhouse gas and energy reduction goals and encourages the use of renewable and highly energy-efficient technologies. Implementing EO 13123 will help EPA and other agencies save taxpayer dollars and protect the environment.

REDUCTION GOALS

EO 13123 increases the energy consumption reduction goals established in EO 12902, signed in 1994, and includes new greenhouse gas reduction goals. No federal facility will be exempted from these goals unless it meets new exemption criteria to be issued by DOE. The box on page 3 provides specific information on each of these goals.

continued on page 3

Biomass—Harvesting Tomorrow's Energy

In the search for alternatives to Earth's limited energy sources, EPA and other organizations are looking with hope to a unique combination of technology and ancient agricultural practices—biomass energy. For centuries, humans have subsisted by cultivating the Earth's vegetation. Now, thanks to advancing technology, harvesting organics could be the key to a clean and sustainable energy future.

Biomass is plant matter, most often composed of wood and wood wastes, that naturally stores supplies of solar energy as complex carbon-based molecules. As biomass undergoes photosynthesis, carbon dioxide combines with water to produce carbohydrates, the basis of biomass energy. By burning biomass, we can extract the energy stored in the chemical bonds and harness it to generate power.

Already a viable energy option, there are three main ways that biomass can be used for energy generation:

- **Direct combustion**—biomass is burned, creating steam, which can move a turbine attached to a generator.
- **Gasification**—gasifiers heat biomass in an oxygen-starved environment, breaking it into chemical components and creating a product gas suitable for fueling advanced power systems.
- **Pyrolysis**—heat is used to chemically convert biomass into pyrolysis oil, which is easier to store and transport than solid biomass material. This oil is then burned, like petroleum, to produce electricity.

Emerging bioconversion and thermal conversion technology will inevitably enhance the cost-effectiveness and practicality of biomass energy, but its environmental appeal is inherent and already well-known.

Nonrenewable forms of biomass, such as coal, gas, and oil, represent carbon deposits laid into the earth millions of years ago from decaying plants and animals. As we use these fuels, carbon deposits are released, altering the natural carbon cycle. The existing carbon cycle cannot assimilate these new releases of carbon, allowing carbon dioxide and methane to accumulate in the atmosphere trapping solar radiation.

Burning biomass, however, contributes no stored carbon dioxide to the atmosphere. The carbon dioxide released during combustion is balanced by new plant growth. As a result, the greenhouse effect and air emission problems associated with fossil fuel combustion are eliminated, and carbon releases are ready for plant assimilation.

Biomass resources have a regenerative cycle of 30 years or less, making the possibility of biomass crops, specially harvested and replenished, a plausible scenario for future energy supplies.

Many options exist for biomass energy use. Biomass can be converted into transportation fuels such as ethanol, methanol, biodiesel, and additives for reformulated gasoline. These biofuels can be used in pure form or blended with gasoline. Biomass also can be used to manufacture products such as solvents, sorbents, and construction materials.

Thus far, we have just begun to explore the benefits of this alternative energy source; its potential, however, is vast and promising. For more information on biomass energy and products, their various uses, and the latest technological developments, visit <www.nrel.gov/lab/pao/biomass_energy.html>, <www.eren.doe.gov/biopower/>, or <www.usda.gov/aarc>.

Breaking New Ground—EPA's Biomass Energy Projects

INTERNAL EPA FACILITY PROJECTS

Athens, Georgia. Results of a recent feasibility study conducted for the Athens laboratory indicate that large quantities of biofuel are available locally. Next, the size, type, cost, and potential funding options for the plant equipment will be determined. A strong partnership between EPA, DOE, USDA, and state agencies will be the foundation for making this project a success.

Richmond, California. EPA has just signed a contract to purchase 1.8 million kilowatt hours of electricity generated from landfill methane gas. Due to deregulation of California's electric industry, EPA, along with other electricity consumers in the state, can now purchase electricity that is generated using renewable resources such as biomass.

New Executive Order *continued from page 1*

The new EO also mandates that by 2010, every agency reduce its greenhouse gas emissions associated with facility energy use by 30 percent compared to 1990 levels. Greenhouse gas reductions related to other agency efforts, such as the use of alternatively fueled vehicles, can count toward facility greenhouse gas reduction goals if approved by the Office of Management and Budget. Agencies will continue to conduct energy and water audits as previously mandated in EO 12902.

RENEWABLE TECHNOLOGIES

EO 13123 strongly encourages federal agencies to expand the use of renewable energy and energy-efficient technologies within their facilities. The government will strive to install 2,000 solar energy systems at federal facilities by the end of 2000, and 20,000 by 2010. This will be done to support the President's Million Solar Roofs Initiative, which hopes to install 1 million solar energy systems across the United States by 2010. The new EO also encourages agencies to purchase Energy Star® and other energy-efficient products.

SUSTAINABLE BUILDINGS

According to the new EO, DOD and GSA, in consultation with DOE and EPA, will develop sustainable design principles. Agencies will optimize life-cycle costs, pollution, and other environmental and energy costs associated with the construction, life-cycle operation, and decommissioning of facilities. In addition, agencies should strive to meet the Energy Star® Building criteria for energy performance and indoor environmental quality to the maximum extent practicable by the end of 2002. To help fund these projects, agencies are encouraged to use energy-saving performance contracts, which allow them to implement energy-efficient or renewable technologies without having to incur the associated capital costs.

For a copy of EO 13123, visit <www.pub.whitehouse.gov/search/executive-orders.html>.

EO 13123 Energy Reduction Goals

INDUSTRIAL AND LABORATORY FACILITIES (1990 BASELINE)
20 percent by 2005
25 percent by 2010

OTHER FEDERAL FACILITIES (1985 BASELINE)
30 percent by 2005
35 percent by 2010

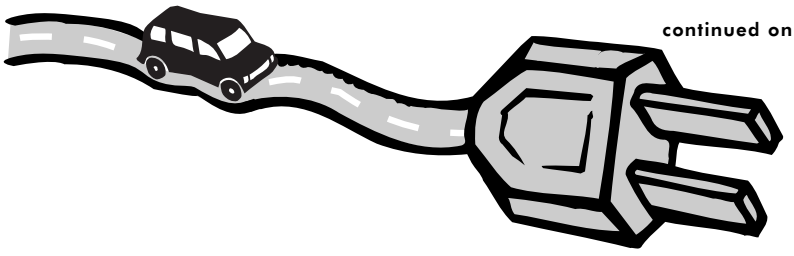
Note: Every federal facility must meet these goals unless it meets new exemption criteria.

Headquarters Drives Down Electric Avenue

EPA Headquarters has added a new electric-powered pickup truck to its fleet of alternative fueled vehicles (AFVs). The Ford Ranger electric vehicle, which generates no emissions, has an approximate range of 50 miles between charges and a maximum speed of 80 mph.

Five to 10 FMSD employees will use the vehicle three to four times per week to serve Headquarters' satellite buildings and to transport equipment and displays to EPA ceremonies and special events. The Potomac Electric Power Company (PEPCO) loaned the vehicle to EPA in February 1999 for a free 2-month trial period through its Federal Fleet Electric Vehicle Acquisition Program. The vehicle impressed Headquarters' staff, who will lease the vehicle for 3 years at about $350 a month. The Federal Fleet Electric Vehicle Acquisition Program, created by PEPCO, DOE, and the Ford Motor Company, is a pilot project to help make electric vehicles a commercial reality. In addition to free trial periods, the program provides special financial arrangements for federal agencies interested in leasing electric vehicles.

Similar electric vehicle loaner programs exist in Richmond, Virginia; Los Angeles; San Diego; Atlanta;



continued on page 4

OARM Resources

How well is EPA living its mission? You can find out by looking at two new documents that chronicle some of EPA's environmental activities in fiscal year (FY)1998.

The *Pollution Prevention Progress Report in Compliance with Executive Order 12856* describes EPA's activities in the areas of chemical management, energy and water conservation, waste prevention and recycling, affirmative procurement, and green buildings. In addition, it covers the programmatic assistance provided by EPA's Office of Administration and Resource Management (OARM) and describes the communications and outreach methods OARM uses to convey its pollution prevention messages.

Each year, in compliance with the Energy Policy Act of 1992 and two EOs, EPA submits a report—*Environmental Protection Agency Management and Conservation Program*—to DOE. This document discusses the goals, strategy, tools, and implementation activities of EPA's Energy and Water Conservation Program. Also detailed are facility pilot projects and funding mechanisms for these projects. Appendices provide facility-specific energy and water consumption and cost data, and motor vehicle information. A synopsis of some of the energy and water consumption information is provided in the table on the right.

To order the *Pollution Prevention Progress Report in Compliance with Executive Order 12856* (EPA202-R-99-001) or a copy of the *Environmental Protection Agency Management and Conservation Program,* call Phil Wirdzek at 202 260-2094. Also, stay tuned to the Office of Administration's Web site <www.epa.gov/oaintrnt>, as these documents will be added to the site soon.

Percentage of Change in EPA Laboratory Energy and Water Consumption From FY95 and FY96 to FY98

Location	Difference in Btu/ft² FY95 to FY98 (%)	Difference in Gallons of Water Consumption FY96 to FY98 (%)
Narragansett, RI	12.3	86.4
Edison, NJ	20.9	20.7
Athens, GA	-1.0	-20.2
Gulf Breeze, FL	-20.1	-21.5
Montgomery, AL[1]	—	—
RTP, NC	4.8	-43.3
Ann Arbor, MI	-10.5	-5.6
Duluth, MN	-3.1	18.2
Cincinnati, OH	-0.5	-34.4
Ada, OK	-9.7	148.7
Houston, TX	-42.7	10.1[2]
Las Vegas, NV	-6.8	-13.7
Richmond, CA	-5.1	150.2
Manchester, WA	-5.0	7.9
Newport, OR	-9.2	-15.5
Corvallis, OR	-20.9	8.8
Net Difference	-8.5	-19.7

1. Did not report consumption in FY97 or FY 98.
2. Difference in consumption from FY97 to FY98.

Electric Avenue *continued from page 3*

and Boston. DOE is working with utility companies in each area, which grant the same services PEPCO provides to EPA Headquarters. Each utility has three to ten vehicles to loan to federal fleets within the utility's service territory.

The acquisition of electric vehicles supports the mandate of EO 12844, *Federal Use of Alternative Fueled Vehicles,* which requires federal agencies to adopt aggressive plans to exceed the purchase requirements of AFVs established by the Energy Policy Act of 1992. Both DOE and GSA are authorized to assist agencies with EO 12844 by paying the incremental costs of AFVs associated with acquisition and disposal (DOE) or by providing incentives to purchase AFVs, such as priority processing of procurement requests (GSA). Purchase of the Ford Ranger would cost between $30,000 and $35,000.

EPA has acquired more than 100 AFVs nationwide, most of which run on compressed natural gas (CNG). These vehicles reduce air pollution and encourage technological leadership in an important U.S. industry.

For more information on the Agency's AFV fleet, contact Melvin Joppy at EPA Headquarters at 202 260-6232. Additional information on the national electric vehicle loaner program is available at <ev.inel.gov/sop> or by calling Jim Francfort of DOE at 208 526-6787.

Chemical Management at EPA Labs

One of EPA's ongoing goals is to ensure safety and health in all of the Agency's laboratories. Achievements in this area include the development of a laboratory operations manual and related products that stress proper chemical management. These tools provide examples of pollution prevention activities such as reducing the use of certain chemicals, streamlining inventory functions, implementing best practices, and enhancing compliance. In addition, EPA is developing greener chemical process alternatives, chemical ordering systems, and chemical adoption programs.

EPA's Safety, Health, and Environmental Management Division (SHEMD) is collaborating with EPA's Green Chemistry Program to investigate environmentally preferable alternatives to testing procedures that generate solvent waste.

A process called Soxhelt chemistry, in which samples are distilled in solvents, is the primary generator of this hazardous waste.In 1992, a total of 78,743 kilograms of solvent hazardous waste was produced in EPA labs by this process.

A report, currently under review, compiles data explaining how each chemistry test and process affects the environment and human health. The most detrimental processes identified in the report will be replaced with more environmentally sound procedures such as micro-analytical chemistry and solid phase extraction. Use of these greener processes will eliminate 80 to 90 percent of the solvent wastes currently generated.

EPA also is focusing on reducing unnecessary chemical purchases by instituting a pharmacy system for ordering and stocking chemicals. Each facility tracks its inventory through a bar coding system maintained in a database. When a chemist needs to order a particular chemical, the procurement department can first determine if there is any of the substance in-house, perhaps owned by another department. Interdepartmental chemical sharing is being used in 50 percent of EPA's labs. It allows a facility to reduce the amount of chemicals purchased and the number of expiration dates exceeded.

A related chemical adoption program also operates throughout many EPA labs, including Research Triangle Park in North Carolina and Central Regional Laboratory in Chicago, Illinois. After completing a project, chemists can take remaining chemicals to designated, stable areas and make them available to other chemists.

For more information on these projects, contact Jeff Davidson of SHEMD at 202 260-1650 or <davidson.jeff@epa.gov>.

Hard Hats Off to EPA

This June, EPA's National Vehicle Fuel Emissions Laboratory (NVFEL) Office Building in Ann Arbor, Michigan, won the Engineering Society of Detroit Construction and Design Award. The award recognizes the architects, engineers, contractors, and owners of the facility in areas such as overall design quality, effective teaming, land use and environmental considerations, and energy consciousness.

The building also is the first EPA-leased facility eligible for the Energy Star® label. The Energy Star® program is currently verifying the building's energy performance, the final step before awarding the Energy Star® label.

EPA's commitment to pollution prevention through improved energy efficiency was a critical concern during the construction of the 66,000-square foot NVFEL office building.

Therefore, the building's HVAC system includes direct digital controls (DDC) technologies that minimize the energy required to maintain optimum building airflow. Although the DDC system reduces energy consumption, the air flow remains consistent with ASHRAE Standard 62-1989 "Ventilation for Acceptable Indoor Air Quality." In addition, heating and cooling in the facility is provided by natural gas-fired, high-efficiency hot water boilers and CFC-free electric chillers. Variable frequency motors help minimize the energy requirements of major fans and pumps.

Abundant argon-filled, "low emissivity" windows and skylights not only reduce the amount of solar heat load that enters the building but also reduce the number of lights needed. When lights are required, however, the building's "uplighting" design provides indirect room lighting from a bright ceiling, which further reduces the number of light fixtures required. Occupancy sensors also are installed throughout the facility to turn off the lights in unoccupied rooms.

The NVFEL office building is owned by the First Martin Corporation of Ann Arbor, Michigan, and was designed by Jickling Lyman Powell Associates, Inc., of Troy, Michigan.

For more information on EPA's NVFEL office building, call Dick Lawrence of EPA Region 5 OAR at 734 214-4243 or Doris Ellis of FMSD at 202 260-8038.

Labs for the 21st Century Conference

Designers, engineers, owners, and operators of laboratory buildings are invited to the "Laboratories for the 21st Century" conference, a unique opportunity for learning and sharing information on incorporating energy-efficient and renewable energy technologies into laboratory design and operation. The conference, sponsored by EPA and DOE's Federal Energy Management Program (FEMP), will be held September 8 to 10 in Cambridge, Massachusetts, and will include sessions on financing efficiency improvements, adopting energy recovery strategies, retrofitting laboratories, and defining the environmental requirements of 21st century laboratories, among other topics.

On the first morning, EPA will announce the development of an important new initiative called Labs21. The initiative will become a voluntary program to improve the energy efficiency of public and private sector laboratories. Additional details will be provided at the conference.

"EPA is committed to establishing a new environmental standard for reducing energy consumption in its laboratories in the next six years," explained Romulo Diaz, conference key-note speaker and EPA assistant administrator for Administration and Resources Management. "We are eager to share information about energy efficiency and pollution prevention experiences with private sector and other government labs. We also are looking forward to an open and professional exchange of ideas and experiences that can contribute to general operational improvements in our nation's laboratories."

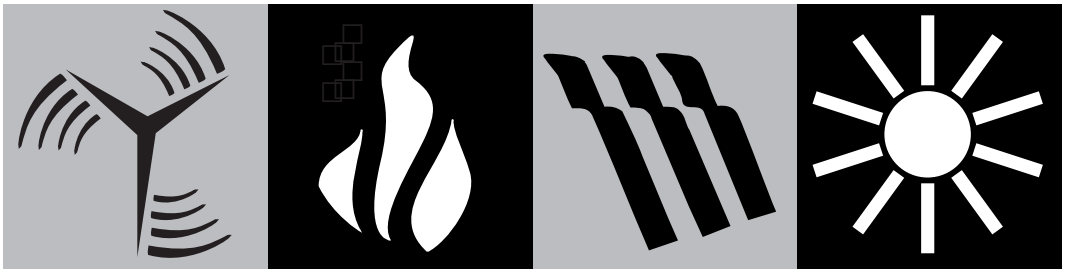
The conference will feature tutorials on efficiency and renewable energy and presentations on designing, building, and operating low-energy laboratory buildings. Panel discussions, design critiques, breakout sessions, and laboratory tours also are planned. Participants will include leading energy and design experts from the Lawrence Berkeley National Laboratory, the American Institute of Architects Committee on the Environment, the National Renewable Energy Laboratory, EPA, FEMP, and private and public sector laboratories.

"Participants will have an opportunity to meet the specialists that are shaping the future of the industry," said Donald Prowler, one of the conference planners and Professor of Architecture at Princeton University and the University of Pennsylvania. "Through this interaction, attendees will leave with a wealth of new design ideas and implementation strategies."

Panel discussions will include case studies demonstrating ways in which the strategies or technologies are being implemented successfully. Breakout sessions will provide opportunities to explore specific issues in greater detail. Throughout the 3-day conference, the following topics will be discussed:

- Defining the environmental requirements of 21st century laboratories.
- Designing energy-efficient laboratories.
- Benchmarking energy consumption.
- Financing efficiency improvements.
- Evaluating HVAC equipment and options.
- Reviewing information systems and control strategies.
- Adopting energy recovery strategies.
- Using renewable energy.
- Improving integrated laboratory design strategies.
- Learning how utility restructuring affects utility options and costs.
- Incorporating life-cycle cost concerns in decision making.
- Commissioning and retrofitting laboratories.

For more information on the "Laboratories for the 21st Century" conference, call the FEMP Workshop Hotline at 703 243-8343. Visit the conference Web site at <www.epa.gov/labs21 century> for an updated agenda and details on accommodations and registration. Registration is free for all EPA employees.



LABS FOR THE 21ST CENTURY

<www.epa.gov/labs21century>

EPA Opens Fort Meade Science Center

While the Army considers Fort Meade an "Installation for the 21st Century," EPA could say the same of its new Environmental Science Center, located on the Maryland base. EPA's facility, which officially opened in April, incorporates numerous environmental features as part of the Agency's overall commitment to protect human health and the environment. The 140,000-square-foot facility features green building technologies including energy-saving lighting, an environmentally friendly climate control system, natural landscaping, and the use of green building materials.

The new facility provides office space for 150 people and consolidates six leased facilities into one government-owned site. The center includes 70 laboratories for chemistry, biology, and microbiology and supports soil, air, and water testing to determine the presence of pollutants and other contaminants. The facility also contains a library, six conference rooms, and a video conferencing center.

ENVIRONMENTAL BUILDING ELEMENTS

In designing the Environmental Science Center, EPA took the opportunity to develop a unique facility with minimal environmental impact. Some of the environmental features incorporated into the facility include:

- *Energy-Efficiency*. In keeping with EPA's Green Lights program, the center maximizes natural lighting, which is augmented by energy-efficient electrical lighting to reduce pollution and save energy. A DDC unit monitors the status of mechanical systems throughout the building to maintain peak efficiency. Variable air volumes for lab spaces minimize heating and cooling costs while maintaining a safe working environment.
- *Water Conservation*. The building uses low-water flush units and maintains a separate water supply for cooling water.
- *Climate Control*. The building's temperature is controlled by non-ozone-depleting coolants and heat exchangers.
- *Landscaping*. Native plants were planted or maintained on the grounds, which reduces irrigation and pesticide needs. During construction, efforts were made to save as many trees as possible.
- *Materials*. The center was constructed with concrete containing recycled incinerator residue (fly ash), and recycled asphalt was used for parking and roadway surfaces. Lab cabinetry is made of wood from a managed forest, which cost less than comparable metal casework.

In addition to these environmental features, the building ensures the safety of laboratory workers and the surrounding environment with seamless floors that resist spills, overhead gas lines that eliminate the need for free-standing gas cylinders, and special exhaust systems that prevent hazardous gases from mixing.

All of these green design elements have come together to create a facility where EPA scientists and other technical personnel can carry out their work to protect human health and the environment in a building that strives to do the same.

Building Stats

140,000 gross square feet

89,000 net square feet of usable space

24 acres of landscaping

$3.2 million to design

$44.3 million to construct

For more information on the Fort Meade Environmental Science Center, contact Robin Danesi of EPA at 410 305-2607.

Attention EPA Facility Managers!!

Please fax your quarterly energy and water consumption data to Scot Case of Eastern Research Group (ERG) at 703 841-1440 or e-mail it to <scase@erg.com>. If you are late submitting consumption data, Scot or one of his fellow ERGers might be calling. If you have any questions about this process or ERG's role, please call Phil Wirdzek at 202 260-2094.

Events Calendar

AUGUST

Energy '99
Where: Orlando, Florida
When: August 23 to 25, 1999
Contact: <www.energy99.ee.doe.gov>

This conference will address energy efficiency, renewable energy, and water energy issues. It also will include presentations on building design, operations, and maintenance.

Competitive Energy Congress/ National Industrial Efficiency Expo
Where: Boston, Massachusetts
When: August 25 and 26, 1999
Contact: 770 447-5083, Ext. 210 or <www.aeecenter.org>

This is the largest conference and exposition devoted to the radically changing power and gas industry. It was developed to provide industrial users with solutions that take into account energy cost control, process optimization, and maintenance.

SEPTEMBER

Laboratories for the 21st Century
Where: Cambridge, Massachusetts
When: September 8 to10, 1999
Contact: FEMP Workshop Hotline: 703 243-8343 or <www.epa.gov/labs21century>

EPA and DOE's FEMP will sponsor a 3-day forum focusing on finding responsible approaches to cutting energy usage and using renewable energy sources in laboratory design and operation.

18th Annual National Recycling Congress
Where: Cincinnati, Ohio
When: September 26 to 29, 1999
Contact: 703 683-9025 or <www.nrc-recycle.org>

The National Recycling Congress is geared toward anyone involved in recycling, from program planning and implementation to education, technical assistance, and policy.

OCTOBER

The '99 WEEC
Where: Atlanta, Georgia
When: October 20 to 22, 1999
Contact: 770 925-9648 or <www.aeecenter.org/shows>

The World Energy Engineering Congress is a comprehensive energy conference and technology expo that covers the latest developments in energy management, HVAC efficiency, and building automation.

NOVEMBER

Leadership Conference: Biomedical Research and the Environment
Where: Bethesda, Maryland
When: November 1 to 2, 1999
Contact: 301 571-9790 or <www.napenet.org/con99int.html>

This conference will focus on creating a national information and education program on best practices for an environmentally sound biomedical research enterprise.

EPA
United States
Environmental Protection Agency
(3204)
Washington, DC 20460

Official Business
Penalty for Private Use
$300